

The Operation of Land Power Plants

Coal Crushing.—One of the most important problems before the power-station engineer is that of burning what is usually termed "low-grade fuel",* and a considerable amount of success has been met with in the working of this problem. A certain power station with which the writer is connected is now running on a very low grade of coal. Rather more than half of the total fuel supplied to the station consists of so-called "duff" coal. Duff is the finest of the dust coals, and 95 per cent of it passes through a 1-in.-mesh sieve. The remainder of the coal comes direct to the power station as it is mined, and is known as "splint" "or "coarse" coal. It is delivered in lumps about as large as a 7-111. cube; but sometimes the lumps run to a length of even 18 in. In order to secure the best combustion, it has proved desirable to crush this large coal, to a size not greater than J-in. cube. Various experiments were made with coal crushers, and a successful type of crusher is that made by Edgar Allen, of Sheffield (fig. i.). It is of the rotary-roll type, the rolls being made of manganese steel. Three pairs of rolls are required to reduce the coal to a suitable size. The coal is then allowed to fall through a rotary coal filler on to a conveyor of the bucket type. The conveyor bucket then passes under another rotary filler from the duff bunker, and a quantity of duff coal is poured into each bucket. In this manner, a good mixture of the fuels is automatically conveyed to the boiler-house bunkers.

It may be asked why it is necessary to crush the splint coal so fine. There are several reasons. Although the splint may have calorific value of 10,000 B.Th.U. per pound, it has been found difficult to burn this fuel on ordinary travelling-grate mechanical stokers if it is larger than J-in. cube. With 2-in. cubes, the fires could not be kept alight for even ten minutes. The second point is this. Under ordinary circumstances, a piece of coal takes about half an hour to travel through a modern

furnace.

The whole of the carbon could not be burnt up in half an hour, unless the coal were finely crushed, while, if the carbon were rejected to the ash chute in

* Low-grade fuel has been defined as fuel which contains more than 25 per cent of ash and 10 per cent of moisture, or which passes through a J-iii.-mesh sieve. *The Use of Low-grade and Waste Fuels for Power Generation*, Kershaw (Constable). 263